Amendments to the Claims

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims

Claim 1 (Previously Presented): A dual-purpose sensor comprising:

a magnetoresistive current sensor having a single pair of terminals;

a conductor adjacent to the magnetoresistive current sensor;

a first current flowing in the conductor during a first time period, the first current having a value that is *a priori* known; and

a second current flowing in the conductor during a second time period, the second time period being different from the first time period,

wherein the dual-purpose sensor produces a temperature measurement in a vicinity of the sensor during the first time period and a current measurement of the second current during the second time period using the single pair of terminals.

Claim 2 (Previously Presented): The dual-purpose sensor of Claim 1, wherein the *a priori* known value of the first current is constant during the first time period.

Claim 3 (Previously Presented): The dual-purpose sensor of Claim 1, wherein the *a priori* known value of the first current is essentially zero amperes.

Claim 4 (Previously Presented): The dual-purpose sensor of Claim 1, wherein the magnetoresistive current sensor comprises a first resistance during the first time period, the first resistance being measured across the single pair of terminals to produce the temperature measurement.

Claim 5 (Previously Presented): The dual-purpose sensor of Claim 1, wherein the magnetoresistive current sensor comprises a second resistance during the second time period, the second resistance being measured across the single pair of terminals to produce the current measurement of the second current in the conductor.

Claim 6 (Previously Presented): A dual-purpose sensor comprising:

a magnetoresistive current sensor having a single pair of terminals;

a first current flowing adjacent to the magnetoresistive current sensor during a first time period; and

a second current flowing adjacent to the magnetoresistive current sensor during a second time period, the first time period being different from the second time period,

wherein both a temperature measurement in a vicinity of the magnetoresistive current sensor and a current measurement of one of the first current and the second current are produced from separate resistance measurements made across the single pair of terminals, the separate resistance measurements being made during each of the first time period and the second time period.

Claim 7 (Previously Presented): The dual-purpose sensor of Claim 6, wherein the separate resistance measurements comprise a first resistance measured across the single pair of terminals during the first time period, the first current being an *a priori* known current, and a second resistance measured across the single pair of terminals during the second time period, the second current having an unknown value.

Claim 8 (Original): The dual-purpose sensor of Claim 7, wherein the measured first resistance is used to produce the temperature measurement, the measured second resistance being used to produce the current measurement.

Claim 9 (Original): The dual-purpose sensor of Claim 7, wherein the *a priori* known current is essentially zero amperes.

Claim 10 (Original): The dual-purpose sensor of Claim 6, wherein the magnetoresistive sensor is a giant magnetoresistive sensor.

Claim 11 (Original): The dual-purpose sensor of Claim 6, wherein the magnetoresistive sensor is an anisotropic magnetoresistive sensor.

Claims 12-18 (Cancelled).

Claims 19-23 (Cancelled).

Claims 24-34 (Cancelled).

Claim 35 (Previously Presented): A dual-purpose sensor comprising:

means for sensing current comprising a single pair of terminals and a resistivity, the resistivity being proportional to an adjacent current and a temperature;

a first current during a first time period adjacent to the means for sensing current, the first current having a value that is *a priori* known; and

a second current during a second time period adjacent to the means for sensing current, the second current having an unknown value,

wherein the dual-purpose sensor produces both a measurement of the temperature during the first time period and a measurement of the unknown value of the second current during the second time period, both measurements being provided using the single pair of terminals and the resistivity.

Claim 36 (Previously Presented): The dual-purpose sensor of Claim 35, wherein the means for sensing current comprises a giant magnetoresistive sensor.

Claim 37 (Previously Presented): The dual-purpose sensor of Claim 35, wherein a resistance measurement of the resistivity during the first time period and the *a priori* known value of the first current facilitate producing the temperature measurement.

Claim 38 (Previously Presented): The dual-purpose sensor of Claim 37, wherein a resistance measurement of the resistivity during the second time period and the temperature measurement facilitate producing the current measurement.

Claim 39 (Previously Presented): The dual-purpose sensor of Claim 35, wherein the *a priori* known value of the first current is a constant value equal to zero amperes.

Claim 40 (Previously Presented): A dual-purpose sensor comprising:

a first output during a first time period, the first output representing a temperature measurement in a vicinity of the dual-purpose sensor;

a second output during a second time period, the second output representing a current measurement;

a magnetoresistive current sensor having a single pair of terminals; and

a current adjacent to the magnetoresistive current sensor, the current having an *a priori* known value during the first time period and an unknown value during the second time period,

wherein both the first output and the second output are associated with the single pair of terminals, the first output employing the *a priori* known value of the adjacent current to represent the temperature measurement and the second output employing the temperature measurement to represent the current measurement, the current measurement determining a value of the adjacent current during the second time period.

Claim 41 (Previously Presented): The dual-purpose sensor of Claim 40, wherein the *a priori* known value of the first current is constant during the first time period.

Claim 42 (Previously Presented): The dual-purpose sensor of Claim 40, wherein the first output is proportional to a resistance between a first terminal and a second terminal of the single pair of terminals during the first time period.

Claim 43 (Previously Presented): The dual-purpose sensor of Claim 40, wherein the second output is proportional to a temperature in a vicinity of the dual-purpose sensor and to a resistance between a first terminal and a second terminal of the single pair of terminals during the second time period.

Claim 44 (Previously Presented): The dual-purpose sensor of Claim 40, wherein the magnetoresistive current sensor comprises a giant magnetoresistor (GMR).

Claim 45 (Previously Presented): A dual-purpose sensor comprising:

a magnetoresistive current sensor having a single pair of terminals; and

a current adjacent to the magnetoresistive current sensor, the current having an *a priori* known value during a first time period and an unknown value during a second time period,

wherein the magnetoresistive current sensor comprises a first resistivity during the first time period and a second resistivity during the second time period, the first resistivity being proportional a temperature in a vicinity of the magnetoresistive current sensor and the *a priori* known value of the adjacent current, the second resistivity being proportional to the temperature and the unknown value of the current during the second time period.